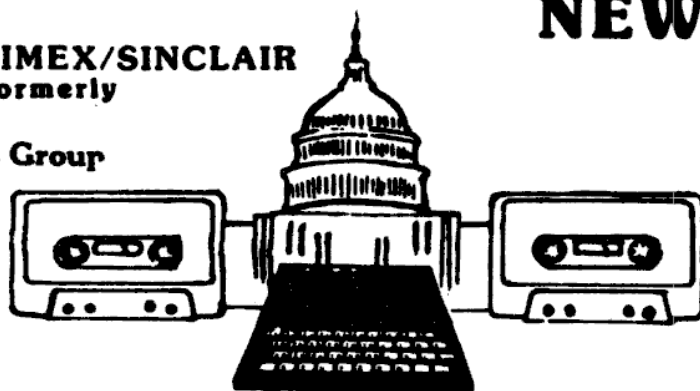


CATS

CAPITOL AREA TIMEX/SINCLAIR
USERS GROUP :Formerly
Prince George's
Timex/Sinclair User's Group

NEWSLETTER



May 1985
Vol. 3, No. 2

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PRESIDENT'S COLUMN

Visitors from Afar

We had an enjoyable surprise at our April meeting. Jerry Chamkis, of the Acme Electric Robot Company (better known as AERCO), gave a demonstration of the prototype 2068/floppy disk interface. He was an enjoyable speaker, both for his wide knowledge, and his continuing enthusiasm for the Sinclair computers. His interface was a wonder. I've seen the layout artwork, and the board has the complexity of the ZX80's. Jerry said that the board took a month to draw, even using MacPaint. Fully populated, the board is really something. In addition to the disk controller chip and its buffers, it carries a second 64K of RAM. This will allow real CPM, once the BIOS is written, or Spectrum emulation without additional boards or chips. The operating system he's writing will take advantage of existing keywords, while also using a file structure that will be compatible with CPM.

In addition, Jerry was just a nice guy. He's serious about generating products for the 2068, but he wants to see if a company can be run ethically. In conversation, his interests range widely, with a refreshing humor and flexibility. Thanks for coming, Jerry.

Another visitor from the great beyond was Fred Nachbaur, technical editor of Syncware News, out from British Columbia. He came down for an executive committee meeting, and we had a freewheeling discussion of his tape conversion of MemoText, his high-res 1000 version of Life, and other such subjects. Fred was a very different bird than Jerry, and the T/S field is the richer for both of them.

New Officers:

At the May meeting, a tentative slate of officers will be announced. Votes will be taken in the June meeting, along with absentee ballots from those members that can't attend. If you've found this club to be valuable, step forward and let us know that you're willing to help. Burnout is a real problem, and unless we can develop a rotating base of support, we won't be together as a club. The place to step

forward is at the executive committee meetings, each Monday night at 700 Erie Ave, Takoma Park (309-7407).

Life...

Jerry's interface is just one example of growth in the field of Sinclair computing. There are a number of other products reputed to be out to expand the 1000 and 2068, and more on the way. Mass storage is now available in a number of forms, from the AERCO and RAMEX floppy discs, through the A&J Microdrives, the the back-bus converters that allow you to use the Sinclair Spectrum accessories. Zebra, John Olinger, Ray Kingsley, and Jerry Chamkis (and others, probably) are all trying to come up with the ideal solution for mass storage. Even the slowest of these arrangements beats the Commodore's disk.

And Death.

Since Timex owners are unusually interested in hardware hacking, we should acknowledge the death of Computers and Electronics. Ziff-Davis killed them off at the same time as a number of the other computer magazines were sold. One can't help but wonder what would have happened if they had kept the format that had lasted for forty years. A sad end for the magazine that kicked off the micro revolution. Replacements to fill the electronic hobbist magazine niche are; 80 Micro, a Z-80 CPU centered magazine, and Radio Electronics, which is more like Popular Electronics than Popular Electronics was. A new entry in the field is Modern Electronics - haven't seen an example yet.

Next Meeting

As mentioned in his insert, Jules will be giving a full-dress presentation on the who, what, how, and why of MODEMS. We'll also have a variety of small groups in the second half. See You There!

Make that Timex Pay

Things I didn't know: S.U.M. News, of 3224 NW 30 Ave., Gainesville FL 32605, pays for articles. They also have about 500 circulation, and charge \$12.00/year. I'd like to see a copy. Syncware News also pays for first-rate articles on the 1000 or 2068. David Kulp, of CATS, will be getting a check this month. A new quarterly, QTS, of 4 Butterfly Dr., Hauppauge, NY 11788, also offers to pay for suitable articles. At least in the case of Syncware News, it's OK if the article has appeared in our newsletter first - so write!

Syncware News is running a contest, for the best 1000 and 2068 program. If we can organize a panel, we can get to judge the entries - and include them in our library. All programs will be public domain, so we should see a variety of new ideas in the near future. The prizes aren't trivial, so perhaps you should get a copy of Syncware News for details, and send in your favorite.

[illegible]

SUBMISSIONS for this newsletter are eagerly solicited. First priority will be given to member's submissions. Publication of material does not transfer rights from the author, in fact, it may establish priority.

Submissions may be reviews, articles on applications, programming techniques, hardware, or anything else you can imagine. Pertinent articles from other publications will also be considered.

Bring material to the meeting, or send it to PO box 725, Bladensburg, MD 20710. I would prefer material to be typed, single spaced, in 3 1/2" columns - but don't break your back: the Xerox doesn't really care. Printouts from the 2040 printer are fine, but, use Radio Shack paper, and don't put scotch tape over the printing.

Permission is hereby granted for reprints of articles in nonprofit user group newsletters. Please give credit to CATS and the author.

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1985

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Contributors

Jim Birney
 Andy Boles
 Jim Broaddus
 John Conger
 Mark Fisher
 Sarah Fisher
 Jules Gesang
 Joe Miller
 Mike Morris
 Bill Powers
 Roald Schrack

IMPORTANT DATES:

<u>Newsletter d/1</u>	<u>Meeting</u>
	May 11
May 17	June 8
June 17	July 13

See you there!



MY WORD!

By John Conger

THE FIFTH GENERATION

By: Feigenbaum & McCorduck

Subtitled "Artificial Intelligence and Japan's Computer Challenge", the story gives a good historical review of progress made in processing knowledge as well as data. Aside from playing strong games of chess, the immediate use of AI has been in the creation of Expert Systems in medical diagnosis and prescription, location of oil fields and the planning and control of large construction projects.

The author is one of America's AI experts in the field. He is a frequent visitor to Japan and has a balanced understanding of the problems and potentials of both Japan and America, especially our ability to respond. Japan's challenge is, of course, important to our military as well as to our technological lead on a broad scientific front.

Arguments as to whether machines can think are beside the point. Computers can simply process information and knowledge in amounts and at speeds that are almost beyond comprehension. Furthermore, expert systems can use their own operating history to improve their performance - in other words, to learn.

The fourth generation of computers involves the large scale integrated circuit. The so called fifth generation is to build on this capability to use enormous data bases and exceptional processing speeds to process knowledge rather than only data. Success would permit the solution of almost any kind of problem, such as weather forecasting and economic forecasting which are notoriously complex and unreliable under present methods.

The Japanese were first to approach the development of such fifth generation machines on an organized basis, with a substantial budget and a draft of the most capable talent from the major computer firms and universities, with the announced objective to lead the world in computer technology by the '90s. A nation so lacking in natural resources other than people must find the prospect of an economy based on marketing knowledge very attractive.

Since 1983 when the book was published, the American response has indeed been substantial. The Military is of course much interested in our maintaining computer leadership and is financing several AI research projects. The government has freed U.S. computer companies from anti-trust threats so they can freely join forces in research and development of new computer technologies.

The National Science Foundation has budgeted \$200 million to sponsor four advanced computer centers. A group of computer firms has formed a research facility in Austin, Texas, under an admiral who formerly headed the CIA to try to meet the Japanese challenge. IBM has its own program, part of a five year \$56 Billion research budget that alone makes the total Japanese effort seem small potatoes.

Anyone interested in computer technology should keep in touch with AI activities. Americas' economic and political future and the maintenance of our lead in

CATS NEWSLETTER EXCHANGE, 4-85

USER'S GROUP

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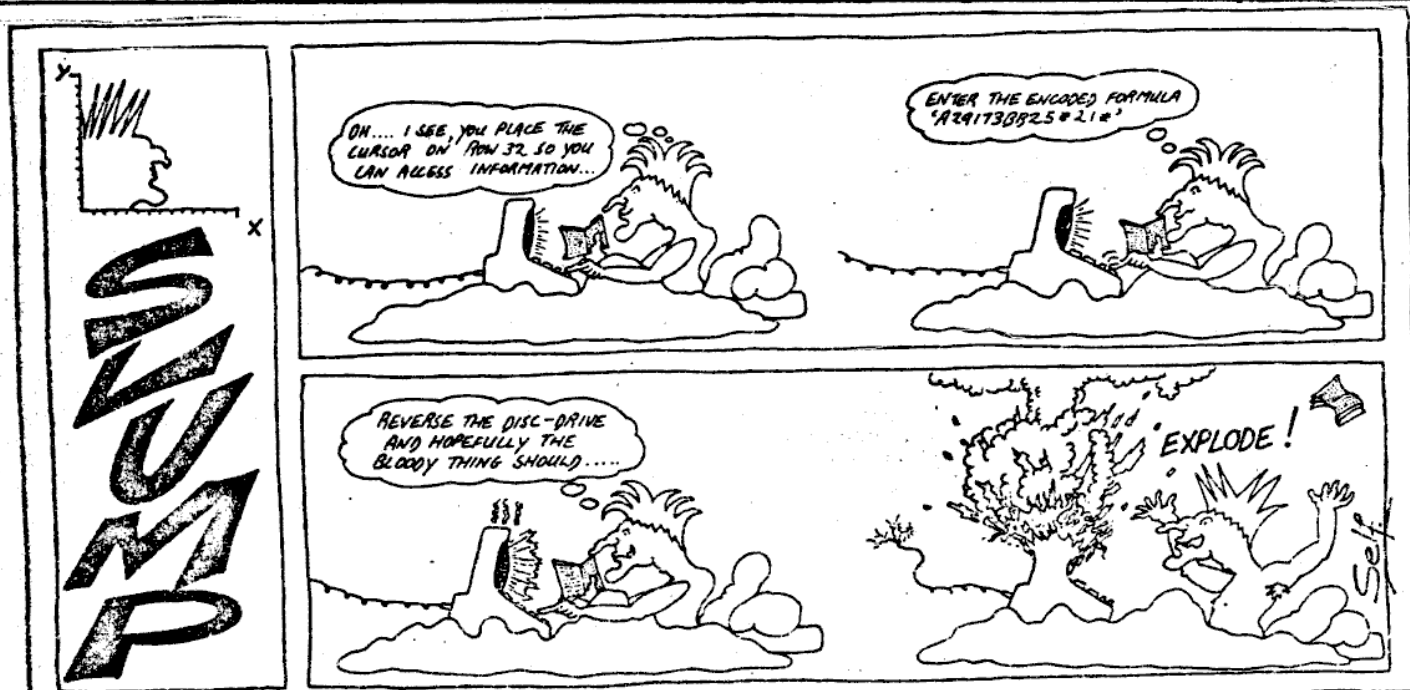
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3,4-85
2,3,4-85
WINT-85
1-85
3-85
1,3-85
1,3-85
1,3-85
1-85
1-85
NONE
1-85
2,3-85
SEPT 84
2,3,4-85



New Statesman, 2/1/85

M Script Supplier

We've been running a lot of stuff on M Script recently; it should be mentioned that it is available, complete with a somewhat prolix 50 page manual, from 21st Century Electronics, 6813 Polk St., Guttenberg, NJ 07093

Credit Where Credit is Due....

We didn't give credit for two important programs last month. First, SPLASH is a program from the Abilene TSUG Newsletter. Second, FAT CHARACTERS was written by Jack Dohany, of a Bay Area user's group.

A MEMBER USES THE REPORT GENERATOR: A T/S 1000 Interface.

Dear Mark:

I'm sorry that it has taken so long to answer your March 25th letter. [I was following up the December CATS article on the Report Generator. ed.] Was waiting to be able to write my response using the Report Generator interface and my new Epson LX-80 printer with WORD*.

Dave Wood of Sirius Ware tailored his WORD* module to work with the ENER-Z interface. Only trouble is that some of the characters just skip, don't print or drop spaces. Think it may be a timing problem. The interface does work well for COPY, LPRINT, or LIST. [WORD* works in FAST mode, remembering to generate a TV display every 60th of a second on its own. It could very well be a timing problem. ed.]

Dave is aware of my problem & looking into a fix. Sooo that's why I must hand respond to your letter.

I'll try to go over your questions in the order you asked them.

1. The print driver is included in an EPROM along with other MC routines used by the Report Generator.
2. The driver prints inverse characters as uppercase. It looks like Word Sinc 2.4 could drive it, with some mods.
3. The driver program is at 2800-2B00 hex. All functions use address 16514 as a data buffer.
4. The designer, builder, and seller of the Report Generator is:

Daniel C. Richardson
ENER-Z Company
P.O. Box 635
Fort Washington, PA 19634
215-674-4828 (evenings)

The many other features of the Report Generator I have had little time to try. I do know that the real time clock works well. In fact just recently I loaded the clock program & got back the correct date (time was not exactly correct) & realized that I had actually set the clock one year earlier. It was a real surprise that the clock was correct.

I have not yet tried the A/D or digital I/O capabilities but am sure they work well....

I am still convinced that the T/S 1000 is a great computer - I have the Tree-FORTH EPROM and switch from BASIC to FORTH. Am learning and using Machine Code & just got Partial Pascal. I have a lot of things I want to do, but like everything -

I just can't find enough time to dedicate to the T/S 1000....

Sincerely,
Jim Birney
3990 Buxmont Rd.
Huntingdon Valley, PA 19006

TAPE DUBBING

By Jim MacKenzie

At the last meeting (14 Apr) I ran a tape dubbing session at the back of the room. To the best of my knowledge everything went well. I've heard no complaints, and I did check one of the tapes on each dubbing to be sure that it had worked.

What we were doing was taking a 2068 tape of homebrew programs (original or copied from magazines) and plugging in peoples tape recorders to a device that allows up to six tape recorders to copy the original tape. We may thank Mark Fisher for this wonderful little device.

Since this was the first time there was some confusion so I'll try to do better next time. I hope to make this a permanent feature for our future meetings, for both the 2068 and 1000. It will depend on program contributions and usage (come on now). To me this is one of the best aspects of the club because we can get free programs as well as have a chance to discuss the program with the author.

The 2068 programs offered at the last meeting included two disassemblers and a mailing list program among others. This tape will be brought to the next meeting as well as a 1000 tape containing some game programs, an assembler, and a fabulous grocery list by George White. We need input in order to make this work!

To participate bring a tape (60 min), and if possible a tape recorder, to avoid electrical interference I recommend that your recorder be run on batteries. I'll try to find some spare tape recorders, but when working with Timex you're better off saving and recording with the same tape recorder. I'll also try to have a few blank cassettes for sale. I'll be looking forward to seeing you at the next meeting.

SECOND SOURCE FOR THE SPECTRUM ROM DISASSEMBLY

The Complete Spectrum Rom Disassembly, which was reviewed in last month's newsletter, is also sold by Sunset Electronics, according to their most recent catalog. The address is 2254 Taraval St. San Francisco Ca. 94116. The book was not listed in a Zebra catalog received after the review was published, so it may be that it is no longer available from them.

4/5/85
C.A.T.S. c/o Mark Fisher
700 Erie Ave.
Takoma Park, MD 20912

Dear Mark,

Thanks for your letter explaining the membership dues.

As to what is happening with the Timex/Sinclair users here in the Memphis area, I am sad to report that we have just about ceased to exist.

The Mid-South T/S C.U.G. was formed here in Memphis in mid 1982 and by the end of 1983 we had approximately 100+ members. After the demise of Timex we dropped to approximately 35 members and continued a fairly active users group throughout 1984. At the start of this year we tried to restructure the group and wound up losing all but a core group of about 12. We have stopped publishing our newsletter in January and are currently in a state of limbo.

We like the changes in your newsletter since the first of the year; it was getting too heavy on reprinting other material towards the end of last year. We already get ZX COMPUTING here in Memphis. We are especially interested in your SPECTRUM/ROMSWITCH program listings and related reviews.

The following are the items/issues we are most interested in seeing addressed:

In depth reviews and comparisons between the AERCO and RAMEX disc operating systems. Does either system plans to support the SPECTRUM mode via ROMSWITCH, etc.?

Will A&J Micro support the SPECTRUM mode via ROMSWITCH and will DAMCO support the 2068 mode? WHY can't the DAMCO system be used with our current EMU-1 &/or ROMSWITCH?

We can't see buying two separate operating systems and at this time it does not appear any of the systems have solved the problem of how to transfer the "unstoppable" programs from tape to disc of wafer.

We would be VERY interested in hearing about solutions to this last problem!

Sincerely

Andy Boles
M-S T/S CUG
2059 Pennel Cove
Memphis, Tennessee 38116

Sinclair of Louisville Users Group (SLUG)
C/O Jim Broadbus, Secretary
9800 Mary Dell Ln
Louisville Ky 40291

Dear Fellow Timex User Group,

We have just formed a new User Group in the Louisville KY area and have about 35 members. We have been in contact with other User Groups and some of them have expressed an interest in exchanging Newsletters and Programs. We have started a library for our members so they may share information from other User Group's Newsletter and also obtain programs that they may not have themselves. We would be happy to swap programs/newsletters with your group if you are interested.

Our Group consists of members who are interested in:
Programming: Machine, Basic and Porth.

Games

Business Programs

Building and Modifying

Amateur Radio uses of the Timex

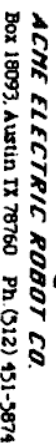
Of our 35 Members, we have 8 who have the 2068, 3 who have the 280,1 who has the 1500 and the rest have the T/S 1000.

We would appreciate hearing from your group with some ideas and information that would benefit us and we would like to share our resources with your group if possible.

I am enclosing a copy of our Newsletter and hope that your group will reciprocate.

Yours Truly,

Jim Broadbus, Secretary (SLUG)



64K RAM
8K ROM
RGB OUTPUT
COMPACT SIZE
250K bits/sec



1. Emulate the Spectrum ROM from Disc
2. Run CP/M version 2.2. Access the worlds largest collection of public domain and commercial software.
3. Run a second or much larger program than the original 48K RAM inside the 2068 allows.

FORMAT	INITIALIZES virgin diskettes for subsequent operations
MOVE	WRITES data from the system to the disk
CAT	READS data from the disk to the system
ERASE	REMOVES data from the disk and directory

In all cases, the minimum required syntax for the command is **COMMAND " " ,**

The system can support 4 separate drives of any size; 3", 3.25", 3.5", 5.25", and 8". The drives may be Single, Double, or Quad density except for 8" drives, which are supported only in Single density mode. All drives may be single or double side. All drives must have the (industry standard) Shugart type interface characteristics. This precludes the use of drives intended for standard Apple, Atari, and Commodore machines. The drives may be intermixed in size and all other parameters.

The drives are designated as A: B: C: D: If a drive is specified, it must be the first item in the parenthesis. For example, to format a disk in drive B, the minimum command is **FORMAT "B:"**. In all commands where no drive is specified, the last drive accessed will be used.

The AERCO disc interface includes an additional 64 K Bytes of RAM memory in the DOCK bank. In order to properly recognize the disk related keyboard commands, the bottom 8 K of the system memory must be executed from the DOCK bank. This is accomplished with the command **OUT 244,1**. This may be done either directly from the keyboard or from within a program. If you key in a disk command and the system replies **J Invalid I/O device** simply type **OUT 244,1**, press **ENTER** and re-enter your command.

ONBOARD COMPUTER

by Frank Williams, from Homebuilt Aircraft
(March 1985), submitted by Joe Miller

While for many years the upper echelon of the aviation community has enjoyed the benefits of high-tech devices, general aviation has been slow to adopt the now ubiquitous computer into their cockpits. With the advent of the personal computer, cockpit implementation of the small computer is now both economically feasible and practical.

This article examines the installation and use of a small home computer, the Timex/Sinclair 1000, as a pilot aid in the cockpit. The T/S 1000 was chosen as a likely computer to install for several key reasons. It is compact, light, readily available for under \$50 and requires only a single voltage for operation. Figure 1 shows a simple schematic diagram that will allow the computer to be installed on board. A complete installation package for under \$40 is available from Practiputing, P.O. Box 44167, Tacoma, WA 98444.

This kit includes all necessary filters, regulators and connectors.

The monitor used to display the information can be as simple as a portable black and white television set. The prototype system installed in this author's Cessna 152 uses a 5-inch diagonal television installed at a distance of 30 inches.

Shielded cable was used in all installation wiring and in over 50 hours of use no interference between standard avionics and the onboard computer has been noted.

As software becomes more intelligent, the hardware implementation of the computer will spread to many areas. With proper transducers, engine and aircraft parameters can be constantly monitored, with alarms sounding only when out of range conditions exist. These readings can include such vitals as oil temp, oil pressure, airspeed, rate of climb, roll rate, angle of attack (stall indicator), cylinder head and exhaust temperatures, fuel flow and level, crab angle and magnetic heading, to name but a few.

Does this sound similar to the Boeing 757 Avionics package?

Another area where the computer can shine is in an Area Navigation System. When properly programmed into the computer, this system aids the pilot in gathering information, calculating position and, by using the trigonometric functions on Cartesian coordinate points, can direct the pilot on a heading to his destination, correcting

for winds and magnetic variation. The computer will also display time to destination, fuel status, alternate airport course computation, groundspeed and other items of interest to the pilot.

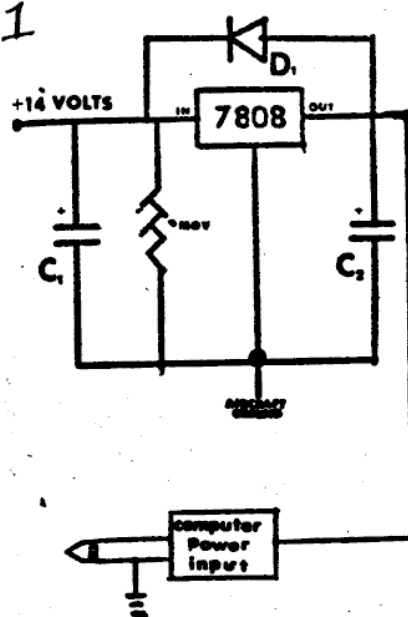
Before flight, the computer prompts you for flight information on your aircraft and destination. This includes things like beginning fuel amount, fuel burn rate, beginning and end points in the flight, and magnetic variation over the intended route.

The Area Navigation Program is menu driven so that all the user must do is select the number that corresponds to the desired function and press a single number between one and nine. All data entered into the computer is numeric and can be entered via an optional 10-key Keypad strapped to the pilot's knee.

The beauty of the installed system is that the computer prompts you for all inputs. The user does not need to memorize sequences of numeric entry or cryptic codes in order to reap the benefits of the silicon age. (And all this for under \$250, including computer, monitor, and software.)

Ed.note: the author of the article didn't mention the name if the program involved in activating this system, but we suppose it's included in the package from Practiputing. Anyone know?

Fig. 1



C1-1000 uF 50 volt
C2- 0.1 uF 25 volt
MOV-metal oxide varistor
Radio Shack number
276-569
D1- 1N914 or equivalent
7808- 8 volt regulator

USER DEFINABLE GRAPHICS MADE VERY EASY by Bill Powers of MAXSOFT.

An almost limitless number of shapes can be made using the User Definable Graphics ability of the 2068 computer. UDGs are quite useful in moving graphics programs, but also in other programs (IE: word processors, to indicate a non-print control character), and other applications limited only by the programmer's imagination.

The trouble is dragging out the graph paper, and doing the old "1"s and "0"s bit (pardon the pun).

But weep no more, friends and neighbors. Now you can turn your monitor or TV screen into a piece of graph paper (ain't computers wonderful), and forget that "1"s and "0"s stuff.

ENTER the program in fig. 1. and RUN it. It will draw a box 8 rows high by 8 columns wide, with an arrow by the top row. Use the number keys, (1 thru 8) to darken the appropriate square (press again to lighten), and use the A or Z key to move the arrow up or down to another row. Darken your design as you wish it to be, and then press ENTER. The computer will print the numbers that you will need to use to generate that graphic, and then print an actual UDG to see if that is the way you really want it. Press M to modify the existing drawing, or write down the numbers for later use, and press ENTER to make another one. (Use break to STOP).

If you had designed the clown as in figure 2, then you would use the numbers shown to the right in any UDG program to create the UDG character shown (below the large one). A typical UDG program is listed in fig. 3, which would cause the clown to be printed any time that you use the graphics E.

Happy Computing.

Illustration 1

```

1 REM "█"=GRAPHICS A
  "░"=GRAPHICS E
10 PLOT 95,55: DRAW 65,0: DRAW
  0,65: DRAW -65,0: DRAW 0,-65
20 POKE 23688,8: DIM A$(8,8):
  LET R=1: FOR L=0 TO 7: POKE USR
  "A"+L,255: NEXT L
100 PRINT AT R+6,10;">"
110 PAUSE 0: LET I$=INKEY$
120 IF I$>"1" AND I$<="8" THEN
  LET A$(R,VAL I$)=( " " AND A$(R,
  VAL I$)="█")+( "█" AND A$(R,VAL I
  $)=" " ): PRINT AT R+6,12;A$(R):
  GO TO 110
130 PRINT AT R+6,10;" " : LET R=
  R+(1 AND I$="Z" AND R<8)-(1 AND
  I$="A" AND R>1)
140 IF CODE I$<>13 THEN GO TO 1
  00
200 DATA 126,64,32,16,8,4,2,1
210 FOR J=1 TO 8: LET L=0: REST
  ORE 200: FOR R=1 TO 8: READ X: L
  ET L=L+(X AND A$(J,R)="█"): NEXT
  R: PRINT AT J+6,23;L: POKE USR
  "E"+J-1,L: NEXT J: PRINT AT 17,1
  5;"█"
300 PRINT #1;AT 1,0;"Another or
  Modify existing": PAUSE 0: IF I
  NKEY$="M" THEN PRINT #1;AT 1,0;"
  " : FOR
  R=7 TO 15: PRINT AT R,23;" " :
  NEXT R: PRINT AT 17,15;" " : LET
  r=1: GO TO 100
310 CLS : GO TO 1

```

Illustration 2

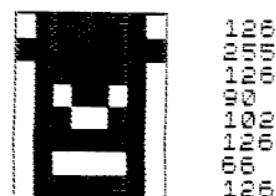


Illustration 3

```

1000>DATA 126,255,126,90,102,126
  ,66,126
1010 RESTORE 1000: FOR X=0 TO 7:
  READ Z: POKE USR "E"+X,Z: NEXT
  X

```

CUSTOMIZE YOUR MSCRIPT

As you know by now, I can't have a program for long before I've got to find something to fool with. In this case, the victim is MSCRIPT. MSCRIPT is a beautiful, full featured word processor. In a month of using the program, I've found only four things to complain about.

1. The characters were hard to read, due to the Timex's method of getting 64 characters on a line. This was solved by Jack Dohaney, of a west coast user's group, in his Fat Bits program as listed in last month's newsletter. Unfortunately, he didn't put his name in the program, and thus wasn't credited.
2. The space key alternately sticks and prints double. This is a Timex hardware problem, due to their 29 cent keyboard.
3. DELETE works opposite to Timex convention, deleting to the right rather than the left. ***** STOP THE PRESS! I've got a patch to change the operation of the DELETE routine - see addendum.
4. TAB is awkwardly placed, requiring pressing the CAPS SHIFT, SYMBL SHIFT, and 8 keys together. This is the one that can be most easily changed.

Most programs use the ROM to translate from the signals recieved from the keyboard to the characters represented. MSCRIPT doesn't do this. It does all its own keyboard decoding, using a set of tables located between 42582 and 42837. Since these tables are in RAM, you can change that table, even so far as creating a Dvorak keyboard, by POKEing new values.

MSCRIPT uses these four tables to translate the electrical key press to an ASCII code for the corresponding letter. Each table is represented by a column in figure #1. It chooses among the four columns on the basis of the status of the CAPS and SYMBL shift keys. The first column headings reflect this. Each of these tables starts at a different address - these addresses are given above each column. MSCRIPT then chooses the offset that corresponds to the key pressed, moves over to the correct column, and returns with the entry at that position.

For example, pressing an unshifted "d" causes MSCRIPT to look in the table starting at 42582, and return with the number at offset seven. This is 100, the ASCII code for "d". If the same key were depressed while holding both CAPS and SYMBL shifts, a 196 would be returned.

In general, numbers followed by a blank have no effect when pressed. In our example, the 196 shown in

the table will be returned, but nothing will happen on the screen. Sometimes that's ok - we don't want to get a character when we press the CAPS SHIFT, for example - but it is in the interests of speed to move as many functions to Caps Shift keys as possible.

To move the TAB function, just LOAD "MSCRIPT" CODE, then poke the TAB value, 152, to the key you wish to use for tab. I wanted the TAB on the SHIFTed 1, so I found the offset for the "1" key (15), and added it to the base address of the CAPS SHIFT column (42646) to get the correct address: 42661. I then typed POKE 42661,152, and ENTER, to put the TAB function on the shifted 1.

Other often used functions are INSERT (CAPS, SYMBL, I) and MERGE (CAPS, SYMBL, M). These could be placed on the unused CAPS shifted 3, 4, or 9. While we're at it, how about making the unshifted 5, 6, 7, and 8 act as the cursor controls? This would allow easy movement around the text, while still allowing the numbers to be printed if they were CAPS shifted. This would be accomplished by exchanging the values at offsets 19, 22, 23, and 24 between the No shift and CAPS shift columns.

I have heard a rumor that 21st Century Electronics is coming out with an updated version. It may have the currently undocumented TAB function improved as listed here. In the meantime, try it yourself. You may get a better fit than the original author could give.

Mark Fisher

Addendum: The operation of the DELETE key can be changed to Timex standard with a seven byte patch. What happens is that the cursor-left routine is called before the delete. To clear space for the patch, the prompt "Block Marker Error!" is shortened to "Block Error", and the seven bytes of m/c put in the space freed.

To insert this patch, load a copy of MSCRIPT, and BREAK after the M/C has loaded. Add the following lines to your FAT BITS loader (as listed in last month's issue), then GOTO 100. When the run ends, SAVE the revised mscript m/c by GO TO 15.

```
100>POKE 38167,223:POKE 38168,1
74:POKE 44755,11
110 RESTORE 150
115 FOR i=44762 TO 44775
120 READ J
130 POKE i,J
140 NEXT i
150 DATA 101,114,114,111,114,17
,81,160,213,195,185,146,33
```

Continued on p.11

MScript Keyboard Decode Table

Base Address	No Shift		SYMBL shift	
	CAPS shift		CAPS+SYMBL shift	
Offset in table	42582	42646	42710	42774
0	00	00	00	00 (caps shift)
1	122 z	90 Z	58 :	218
2	120 x	88 X	96 `	216
3	99 c	67 C	63 ?	195 copy block
4	118 v	86 V	47 /	214
5	97 a	65 A	00	193
6	115 s	83 S	00	211 sub-delete
7	100 d	68 D	92 \	196
8	102 f	70 F	00	198
9	103 g	71 G	00	199 printer code
10	113 q	81 Q	00	209 restore line
11	119 w	87 W	00	215
12	101 e	69 E	00	197 cursor to END
13	114 r	82 R	60 <	210 remove block
14	116 t	84 T	62 >	212 cursor to TOP
15	49 1	129	33 !	145
16	50 2	130capLK	64 @	146
17	51 3	131	35 #	147
18	52 4	132	36 \$	148
19	53 5	133 lft	37 %	149 cur full left
20	48 0	8 del	95 _	24
21	57 9	137	41)	153
22	56 8	136 rgt	40 (152 tab
23	55 7	135 up	39 '	151 page up
24	54 6	134 dwn	38 &	150 page down
25	112 p	80 P	34 "	208 PRINT menu sel
26	111 o	79 O	59 ;	207
27	105 i	73 I	00	201 insert text
28	117 u	85 U	93 j	213 unmark block
29	121 y	89 Y	91 i	217
30	13 ent	13 ent	13 ent	13 ent
31	108 l	76 L	61 =	204
32	107 k	75 K	43 +	203
33	106 j	74 J	45 -	202
34	104 h	72 H	94 ^	200 HELP summary
35	32 sp	128menu	128menu	128menu
36	00	00	00	00 (smb shift key)
37	109 m	77 M	46 .	205 merge text blk
38	110 n	78 N	44 ,	206 new page
39	98 b	66 B	42 *	194 set block mark

The 2068 Random Number Generator

The RND function of the 2068 is implemented by means of a algorithm similar to many other random number generators in both large and small computers. This general class is called "congruential" generators; the 2068 falls in sub-class known as multiplicative generators. The 2068's generator will produce exactly 65536 different numbers before starting to repeat the sequence. At the Feb. CATS meeting, Roald Schrack distributed a handout which noted that a program of the form

```
10 LET X=255*RND:LET Y=175*RND
20 PLOT X,Y:GOTO 10
```

will produce a pattern of vertical stripes. This is in fact a characteristic of all congruential generators, arising from the fact that successive values produced by the generator have a definite relationship. The pattern can be somewhat scrambled by generating and throwing away a number between the generation of values for x and y. For most purposes the generator will be a very good approximation to a true random number generator.

Articles on random number generation have appeared in recent issues of MICRO (June 1984, Oct. 1983), CALL-A.P.P.L.E. (Jan. 1983), CREATIVE COMPUTING (March 1982), and PC TECH J. (Aug. 1984). The formula used in the 2068 is given in the user's manual on page 226. Note that the system variable called SEED in the user manual always holds an integer between 0 and 65536. This number is incremented by 1 before being used to generate the next number, and the new number is decremented by 1 before being saved in SEED. At power-up, SEED will hold 0.

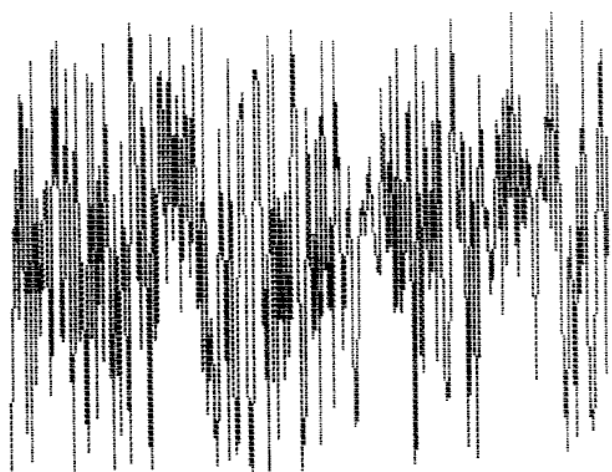
M. S. Morris

```
5 REM this program demonstrates how the RND function of the 2068 works. An integer is stored in system variable "SEED"
```

```
6 REM
10 LET z=PEEK 23670+256*PEEK 23671: REM this is the "seed"
12 LET z=z+1
20 LET a=75*z/65537
40 LET a=(a-INT a)*65537-1
50 PRINT a: REM a is the new value to be stored in SEED
60 PRINT a/65536: REM this is value of RND
70 PRINT RND: REM confirm the calculation of RND
100 PRINT PEEK 23670+256*PEEK 23671: REM confirm that a is the new seed
```

MORE GAMES WITH RANDOM NUMBERS

Another pattern to look for in random numbers is the relation between adjacent random numbers. There should be no correlation. The plot below shows a plot of this type.



```
5 PLOT 0,0
10 LET xl=0
20 LET yl=0
30 FOR x=1 TO 255
40 LET y=RND*150
50 LET yd=y-yl
60 LET xd=x-xl
70 DRAW xd,yd
80 LET xl=x
90 LET yl=y
100 NEXT x
```

Making the amplitude smaller keeps it all on the paper and you can see if there is any long term drift.

```
5 PLOT 0,80
10 LET xl=0
20 LET yl=0
30 FOR i=1 TO 1000
35 LET x=INT (i/4)
36 PRINT AT 1,1;x
40 LET y=RND*15
50 LET yd=y-yl
60 LET xd=x-xl
70 DRAW xd,yd
80 LET xl=x
90 LET yl=y
100 NEXT i
```

A.A. Schrack

EVEN MORE GAMES WITH RANDOM NUMBERS

Looking for "runs" in random numbers will also disclose non random effects. The following program counts how often the next random number is larger than the one before... or smaller. Note that about half the time the direction of change is different between adjacent random numbers.

```
5 DIM d(20)
10 LET w1=0
20 LET n=0
30 LET y1=50
40 FOR x=1 TO 1000
50 LET y=RND*100
60 IF (y<y1) THEN LET w=1
70 IF (y>y1) THEN LET w=0
80 IF (w=w1) THEN GO TO 120
90 LET d(n+1)=d(n+1)+1
100 LET n=n+1
110 GO TO 140
120 LET n=n+1
140 LET y1=y
142 LET w1=w
150 NEXT x
152 FOR i=1 TO 20
160 PRINT i-1,d(i)
170 NEXT i
180 STOP
```

0	417
1	167
2	69
3	9
4	1
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0

Continued on p.13

NEW RELEASE

E-Z KEY now has a "KEYBOARD INTERFACE" module that allows a keyboard to be plugged into the rear expansion connector on your TS1000/ZX81 or the TS2068. This means that you DO NOT have to open up or modify your computer to add a KEYBOARD, JOYSTICK or a NUMERIC KEYPAD. It comes with a keyboard schematic.

Specify KBI-1 for TS1000 or KBI-2 for TS2068. All those "E-Z KEY 60" owners can now use their keyboard on the TS2068.

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C.A.T.S. 12 Newsletter

MULTI-WAY BRANCHING

The need often arises in writing a program to test the value of a variable and then to branch to one of many possible routines depending on the value of the variable. This situation arises in constructing menus for example. Using statements like

IF...THEN GOTO ...

will of course do the job but the 2068 provides a simpler way. The "trick" is that GOTO and GOSUB can be followed by any numeric expression. Thus

GOTO 100+X

will cause a branch to line 150 (or the next line after 150 if 150 does not exist), if X has the value 50. Or, suppose you want to let the user choose one of many alternative actions with mnemonic names. This can be done with a single line:

INPUT A\$:GOTO 100+CODE A\$

If A\$ is "ball", then CODE A\$ will be evaluated as 98 (only the first letter counts) and so the branch will be to line 198. At line 198, of course, you must have the routine to implement the action for "ball". If the user inputs "bat" he will get the same action as "ball" since both strings start with the same letter.

Mike Morris

Continued from p.12

The pattern of such changes in sign is also an indicator of non-randomness. The bar graph below shows the pattern of successive runs. It shows runs of 0,1,2,3,4, and one case of 5. Note that there is no apparent pattern.

```
10 LET w1=0
20 LET n=0
30 LET y1=50
40 FOR x=1 TO 255
50 LET y=RND*100
60 IF (y<y1) THEN LET w=1
70 IF (y>y1) THEN LET w=0
80 IF (w=w1) THEN GO TO 120
90 PLOT x,0
92 DRAW 0,20*x
100 LET n=0
110 GO TO 140
120 LET n=n+1
140 LET y1=y
142 LET w1=w
150 NEXT x
180 STOP
```

R.A. Schrack

10 REM

Precision Multiplication

```
*****
20 PRINT "Give number of digit
s:"
30 INPUT "In first term:";m
40 INPUT "In second term:";n
50 LET k=m+n
52 DIM a(m)
54 DIM b(n)
56 DIM p(k)
58 PRINT
60 PRINT "Give digits of first
term"
62 INPUT a$
64 PRINT a$
70 PRINT "Give digits of secon
d term"
72 INPUT b$
74 PRINT b$
76 PRINT
80 FOR i=1 TO m
82 LET a(i)=VAL a$(m-i+1)
84 NEXT i
90 FOR i=1 TO n
92 LET b(i)=VAL b$(n-i+1)
94 NEXT i
100 FOR i=1 TO m
102 LET c=0
104 FOR j=1 TO n
106 LET q=a(i)*b(j)+c
108 LET c=INT (q/10)
110 LET p(i+j-1)=q-c*10+p(i+j-1)
112 LET d=INT (p(i+j-1)/10)
114 LET c=c+d
116 LET p(i+j-1)=p(i+j-1)-10*d
118 NEXT j
120 LET p(i+n)=c
122 NEXT i
130 PRINT "Product is:"
132 FOR i=k TO 1 STEP -1
134 IF (i=k) AND (p(i)=0) THEN
GO TO 138
136 PRINT p(i);
138 NEXT i
140 STOP
```

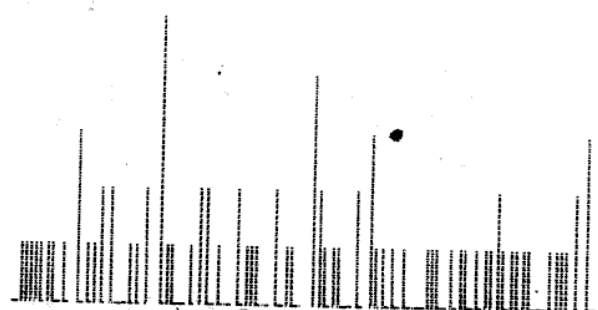
R.A. Schrack

Give number of digits in terms 1
and 2 :30 and 41

Give digits of first term
241573142393627673576957439049

Give digits of second term
45994811347886846310221728895223
034301839

Product is:
11111111111111111111111111111111
11111111111111111111111111111111
11111111



BOLD FACE TYPE !

Here is a program that will allow you to mix **BOLD FACE** and regular type. After loading the program and entering run you are presented with a blank screen.

Normal typing will be obtained until you enter the token "STEP", after that everything will be in **BOLD FACE TYPE** until you enter the token "STOP".

Line 30 loads the machine language program. The definitions of each character are obtained from the ROM. As shown below each character is made up of 8 lines.

To get bold face type each line is shifted to the right by one bit and then "OR" ed back with the original line. This is accomplished in the machine language program. The augmented lines are then used to build a character in the user defined graphics area in position # 145.

```

10 CLEAR 65267
12 LET mode=0
20 LET a=65268
30 FOR i=1 TO 10: READ n: POKE
a,n: LET a=a+1
40 NEXT i
50 LET c=PEEK 23606+256*PEEK 2
3607+256
60 PAUSE 0: LET a$=INKEY$: IF
(CODE a$<>205 AND CODE a$<>226)
THEN GO TO 64
62 IF CODE a$=205 THEN LET mod
e=1: GO TO 60
63 IF CODE a$=226 THEN LET mod
e=0: GO TO 60
64 IF CODE a$=13 THEN GO TO 66
65 IF mode=1 THEN GO TO 68
66 PRINT a$;: GO TO 60
68 LET j=CODE a$-32
70 FOR p=0 TO 7
80 LET byte=PEEK (c+p+j*8): P
OKE 65269,byte:
90 RANDOMIZE USR 65268
100 LET byte=PEEK 65278
110 POKE USR CHR$ 145+p,byte
120 NEXT p
130 PRINT CHR$ 145;
140 GO TO 60
150 DATA 62,0,71,203,63,176,50,
254,254,201,0
160 SAVE "BOLD" LINE 10

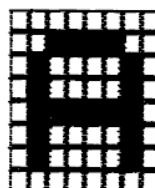
```

```

65268 ld a,n
65270 ld b,a
65271 srl a
65273 or b
65274 ld (nn),a 65278
65277 ret
65278 nop

```

Disassembly of machine language program.



byte

0
60
60
60
60
126
60
60
0

CHR\$ 65 A

bc
value



byte

0
62
90
90
90
127
90
90
0

CHR\$ 145

Representation of the letter A before and after augmentation.

Now is the **TIME** for all good men to come to the aid of their **PARTY**.

R. A. Schrack

Coming in June

Hank Dickson sends word that Timex 1000's appeared in two science fair exhibits. He's working on an article and a presentation at the June meeting, so we can see what these kids have done.

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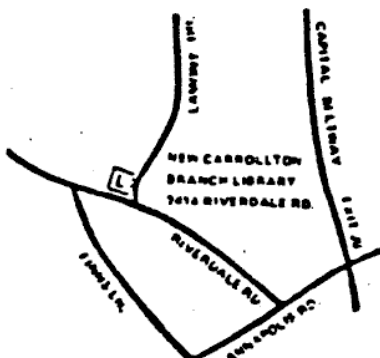
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Meetings are held on the second Saturday of each month at 2 P.M. in the large meeting room of the New Carrollton Branch Public Library.

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